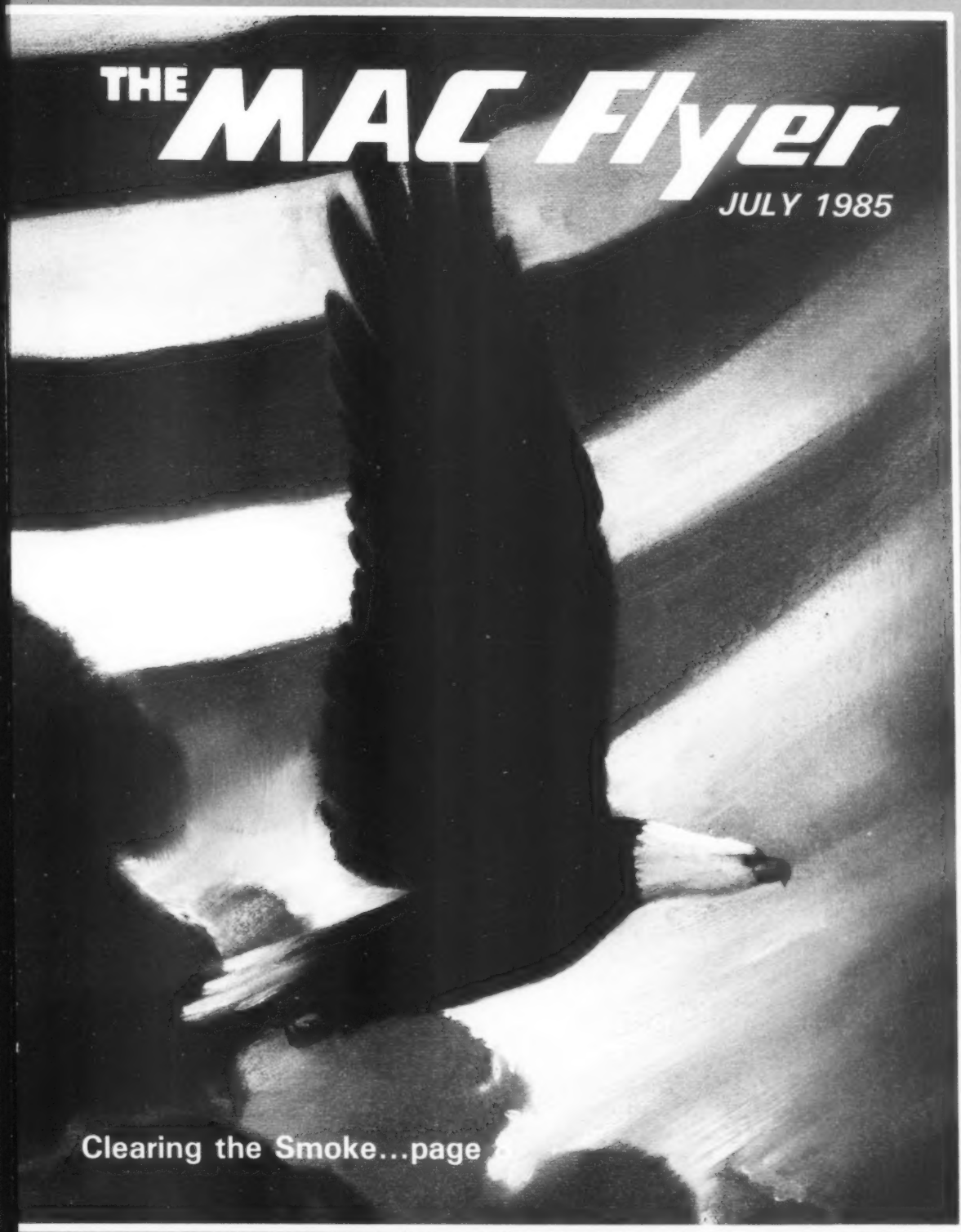
THE MAC Flyer

JULY 1985



Clearing the Smoke...page

THE MAC Flyer

For Greater Safety in MAC Air Operations

July 1985 MACRP 127-5 VOL XXXII NO. 7

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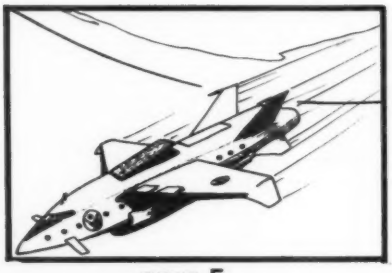

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The MAC Flyer is published by the Director of Safety, Military Airlift Command. The contents are informative and not regulatory or directive. Names of people and places in mishap stories are representative and not necessarily of the aircraft or equipment involved. Information in any article may not be construed as incriminating under Article 31, UCMJ.

Contributions, comments and criticisms are welcome. Write: *The MAC Flyer*, HQ MAC/IGFE, Scott AFB, IL 62225-5101, or Autovon 638-3534. The editors reserve the right to make any editorial changes in manuscripts which they believe will improve the material without altering the intended meaning.

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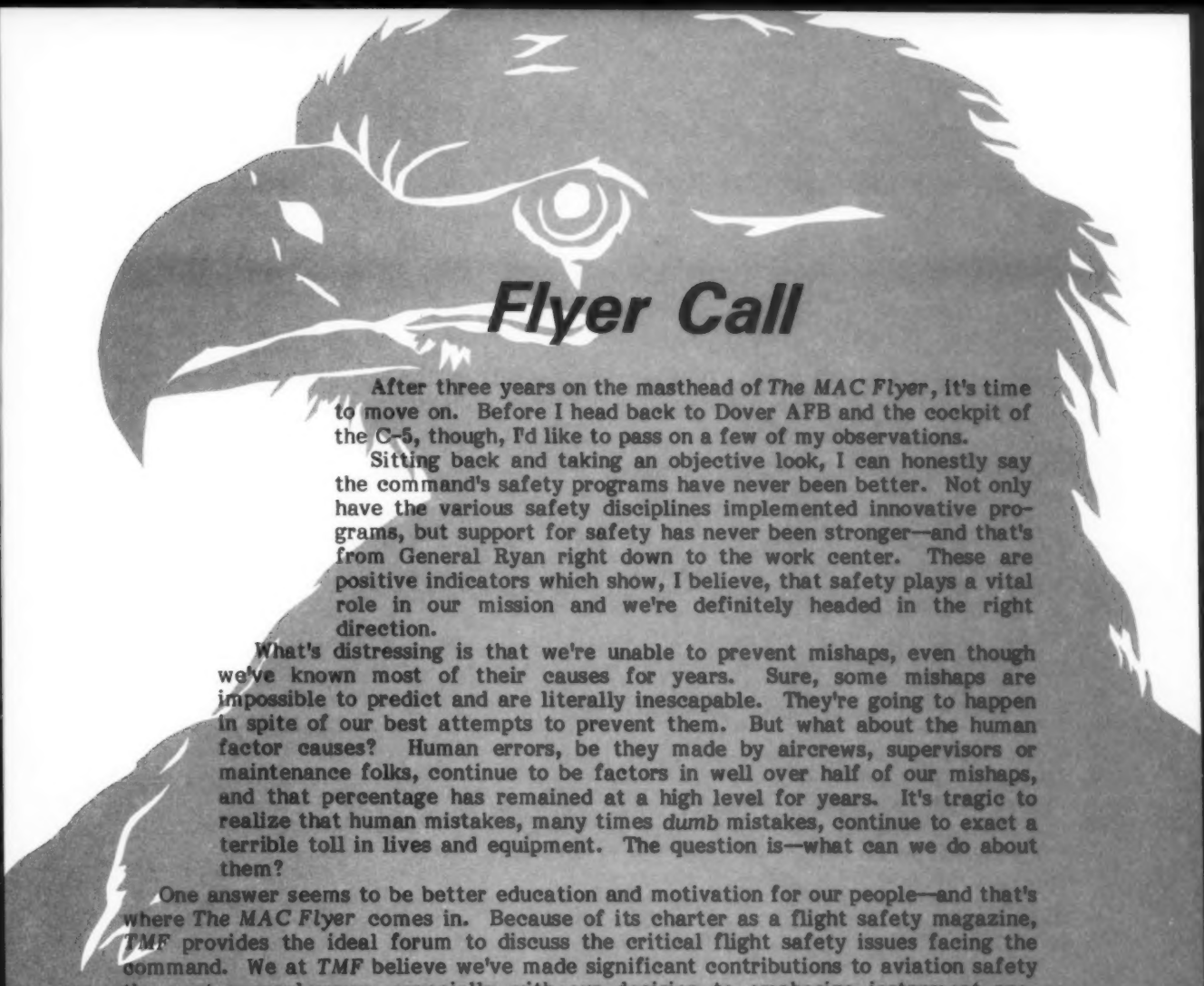


Flyer Call

After three years on the masthead of *The MAC Flyer*, it's time to move on. Before I head back to Dover AFB and the cockpit of the C-5, though, I'd like to pass on a few of my observations.

Sitting back and taking an objective look, I can honestly say the command's safety programs have never been better. Not only have the various safety disciplines implemented innovative programs, but support for safety has never been stronger—and that's from General Ryan right down to the work center. These are positive indicators which show, I believe, that safety plays a vital role in our mission and we're definitely headed in the right direction.

What's distressing is that we're unable to prevent mishaps, even though we've known most of their causes for years. Sure, some mishaps are impossible to predict and are literally inescapable. They're going to happen in spite of our best attempts to prevent them. But what about the human factor causes? Human errors, be they made by aircrews, supervisors or maintenance folks, continue to be factors in well over half of our mishaps, and that percentage has remained at a high level for years. It's tragic to realize that human mistakes, many times *dumb* mistakes, continue to exact a terrible toll in lives and equipment. The question is—what can we do about them?

One answer seems to be better education and motivation for our people—and that's where *The MAC Flyer* comes in. Because of its charter as a flight safety magazine, *TMF* provides the ideal forum to discuss the critical flight safety issues facing the command. We at *TMF* believe we've made significant contributions to aviation safety the past several years—especially with our decision to emphasize instrument procedural knowledge and human factor mishap causes. It was a conscious decision on our parts, and a decision made with only one goal in mind—mishap prevention. We hope we're succeeding.

Unfortunately, all the greatest safety information in the world won't prevent a single mishap unless someone takes the time to read *and* apply it. That's where you, our readers, come in. Not only do we want you to read the *Flyer* and apply that information, we also need to get your feedback on what we write. Are we hitting the target in mishap prevention, or do we need to refocus our efforts? It would really help us if you'd write or call and let us know what areas in flight safety need attention or emphasis. Your comments and suggestions are the best way to help us keep the magazine current, topical, and interesting.

My three years as Supervising Editor of the *Flyer* have been exciting and challenging. But more importantly, I've had the priceless opportunity to help write and edit a respected flight safety magazine, in continuous publication since June 1954. It's very satisfying to look at 31 years of *MATS/MAC Flyers* and know that I played a part, however small, in keeping that venerable magazine alive and well. I wish each of you the very best in the years ahead and pass on only one bit of sage advice to my successors. "Never has the editor been born who can outspell an unabridged dictionary."

JML

The Winners

1985 MAC Flight Safety Writing Contest

First Place

"2101 - A MAC Odyssey"
By Capt. Leonard C. Robinson
89 FTS
Sheppard AFB, Texas

Second Place

"Hazards of the Profession"
By 1st Lt. Stephen James Robison
1402 MAS
Andrews AFB, Maryland

Third Place

"Universal Applications"
By Capt. Clifton L. Bray, Jr.
41 MAS
Charleston AFB, South Carolina

Special Category Winners

"Decisions"
By Mr. Roger Marchant
Narrabundah, Australia

"Letters to Home"
By Mr. James B. Zazas
Carthage, North Carolina

•

Honorable Mention Winners

"Finding of Cause"
By Maj. Dave Moore
732 MAW (Assoc)
McGuire AFB, New Jersey

"Safety of Flight"
By Capt. James W. Stoddard
Det 4, 1401 MAS
Peterson AFB, Colorado

"Passenger Safety of Flight"
By Capt. John W. Pruitt
HQ MAC/TR
Scott AFB, Illinois

•

"A Real Instrument Landing"
By Capt. Anne E. Martin
437 MAW
Charleston AFB, South Carolina

"Two Masks"
By Capt. Thomas A. Farrier
1 HS
Andrews AFB, Maryland

"A Chum of a Navigator"
By 1st Lt. Michael C. Troudt
50 TAS
Little Rock AFB, Arkansas

"A Routine Day"
By TSgt. Bruce F. Hanke
163 TFG
March AFB, California

"An Unanswered Question"
By TSgt. Patrick P. Pendergest, Sr.
USAFETAC
Scott AFB, Illinois

"The Great American Recall"
By Maj. Girard Hoffpauir, III.
89 MAW
Andrews AFB, Maryland

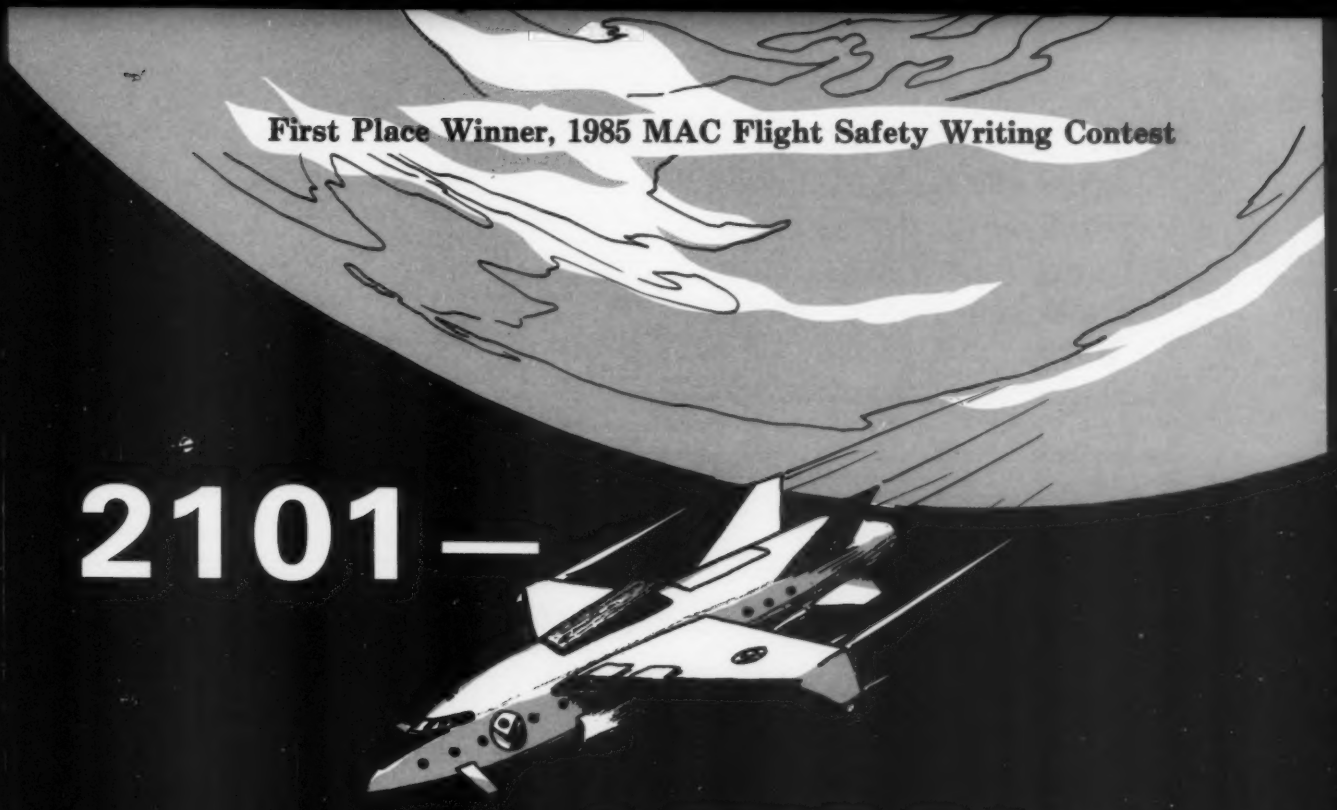
Twenty-five officers, ten enlisted, and two civilians produced 40 entries for the 1985 MAC Flight Safety Writing Contest. All participants are enjoying their C.R. Terror T-shirts and will start receiving their free one-year personal subscription to the *Flyer* with this issue.

First, second, and third place winners will receive engraved desk sets rewarding their literary abilities. Honorable Mention and Special Category winners will each receive an engraved wall plaque. A contest-winning story will appear in each issue of *The MAC Flyer* during the next 12 months, starting with Capt. Leonard Robinson's 1985 first-place winner, "2101 - A MAC Odyssey," page 5.

As usual, competition was tough, with a variety of prose and poetry challenging our judges. We appreciate the exceptionally high quality of the manuscripts and the imagination and hard work that went into each of them.

Remember, it's not too early to start thinking about 1 November 1985, when our next contest begins! Start planning now!!!

First Place Winner, 1985 MAC Flight Safety Writing Contest



2101— A MAC Odyssey

by Capt Leonard C. Robinson
89 FTS
Sheppard AFB, Texas

Good afternoon, Venus Control, MAC 10026 is with you, 312,000 DME Victor November Foxtrot Space TAC. Request enroute reentry followed by vectors MLS pad two-niner to the tractor beam."

You could see the grin on the brand new copilot's face as he spouted out the sub-space laser radio call flawlessly. Lt. Jim Johnson had just become a fully qualified crewmember on his first space crossing.

Two seconds elapsed, due to the slow speed of light, and then came the reply: "MAC 10026, Roger, radar contact. You are cleared to enter orbit, Space Level 300, angle of inclination one-five degrees. Expect atmospheric entry clearance in one hour. Be advised the MLS runway two-niner is out of service for maintenance. Expect precision radar vectoring to the beam. Weather at New Frankfurt Interplanetary is two hundred broken, one thousand overcast. Visibility is one half mile and blowing Co2 fog. Altimeter setting is two-four-three-six."

As the new copilot painfully tried to repeat the clearance, the navigator, Maj. Bob Smith, started programming the last two waypoints into the inertial astrogator.

The spacecraft commander, Lt. Col. Victoria Jones, was completing her programmed enroute rest period. The young copilot decided it was time to wake her up so that they could accomplish the pre-orbital checklist. Groggily, she came to life. "How far out are we?" she asked.

"Oh, about 300,000 miles. Looks like we'll have to orbit for an hour before they'll let us enter the atmosphere--must be stacked up."

"How's the weather?"

After all, he was tired, and Colonel Jones must have been to New Frankfurt many times before.

"Not so good. Two hundred and a half, and the MLS is out. But we still have minimums for the radar approach."

"Okay," said the commander. "Orbit checklist."

"Altimeters," said MSgt. Jerry Malcolm, the space engineer.

"Two-four-three-six, copilot."

"Two-four-three-six, pilot."

"Crew briefing."

"Okay, crew," the commander began, "this will be a left seat precision radar approach to the two-niner tractor beam. Command markers three-four degrees entry AOA, altitude 200 feet. Approach velocity 57 feet per second. Navigation radios will be set up with Venus New Frankfurt Space TAC in number one and Venus Seven Sands Space TAC in number two. Briefing complete."

"Radar," continued the seasoned engineer.

"Set for orbit."

"Retro Rocket Limiter nine-point-one, engineer."

"Nine-point-one, copilot."

"Seat belt sign."

"On."

"Restraining harness and seat angle."

"Adjusted, copilot."

"Adjusted, pilot."

As the engineer set up the artificial gravity for orbit and entry, the copilot got a flare-up of indigestion from the Moon Base Charlie lunch.

"Orbit check completed," mumbled the engineer.

"Do you want me to pull out a terrain chart and the Space Port Restrictions?" asked the green copilot to his mentor.

"Only if you want to look at them," she replied tersely.

"In that case, I don't think I will," the copilot said. After all, he was tired, and Colonel Jones must have been to New Frankfurt many times before. The copilot was bothered by this, however. All during his training the instructors stressed safety and hammered the point that a pilot should always be familiar with terrain obstructions. The copilot concluded that training and operational missions were two separate worlds, so that was that.

The copilot broke out of his trance of deep thought as the space level indicator started showing some life. "Fifty above," he quickly spouted. The capable spacecraft commander followed the steering bars into a perfect orbit and the automatic rocket fire locked them there.

"Copilot's spacecraft. I'm going to run back for a few minutes. Get ready for the approach."

"Okay," the copilot said, and started looking at the approach plate. He knew vectors would probably closely follow the ground track of the out-of-service microwave landing system approach. The reentry would would bring them over the Seven Sands Space TAC and then the radar controller would probably take over. Jim made some mental notes of questions to ask the pilot once they were on the ground.

The Ground Proximity Warning System started spouting, "Whoop Whoop—Pull Up," and the commander promptly disabled the vocal nuisance.

After about ten minutes, the commander came back and strapped into her seat. The hour in orbit finally elapsed and control alerted them that they were cleared for reentry.

"Reentry check," called the spacecraft commander.

"Solar panels and antenna boom."

"Retracted."

"Crew briefing."

"Completed."

"Attitude."

The pilot deftly used the attitude thrusters to flip the giant spacecraft for reentry burn. "Set."

"Reentry burn."

Colonel Jones held the thrust lever for the calculated time. "Completed."

"Attitude."

Colonel Jones rotated the craft to the reentry attitude, 34 degrees, to place the heat shield into position. "Set," she said.

With the experience accumulated in 15 years of flying with the Space Force, she maneuvered the giant C-31 Planetlifter through the reentry procedure.

They entered the opaque white atmosphere of Venus. As the altimeter wound through 70,000 feet, the commander started the four auxiliary jet engines.

"Checking Seven Sands," said the copilot, "for a zero-eight-six course outbound."

"MAC zero-two-six cleared down to five thousand, QNV two-four-three-six, turn right heading zero-nine-five."

"Engineer, load, could you turn down the heat, and what is the local time at New Frankfurt?"

Heat coming down, load. The local time is Yankee plus three, and blocks will be at one-seven."

"MAC zero-two-six, descend to two thousand, standby final controller."

"Engagement check," called the commander.

"But, ma'am," the concerned copilot exclaimed, "min safe altitude is 3,500!"

"Well, min vectoring altitude must be lower."

"Okay," said the copilot, with an odd inflection in his voice.

As they were descending through 3,000 feet, the Ground Proximity Warning System started spouting, "Whoop Whoop—Pull Up," and the commander promptly disabled the vocal nuisance. As the spacecraft approached 2,000 feet, the controller asked, "MAC zero-two-six, verify altitude three thousand?"

The copilot called back, "Negative, two thousand."

This was the sequence of events leading up to the crash of MAC 10026, as determined by the black boxes dug out of the wall of the giant crater near New Frankfurt Colony on Venus. It seems that there is still a margin for error even in these modern times. The Interplanetary Transportation Safety Board investigators determined the controller had given the crew the wrong altitude, 2,000 instead of 3,000 feet. The controller denied it until the holographic disc was played back. The controller was administratively suspended for two months, but the psychiatrists say that because of his torment and mental anguish over causing the deaths of 127 passengers and 6 crewmembers, he will never control spacecraft again. The investigation board concluded that if the crew had used a terrain chart, they would have recognized the bad altitude, or if they had listened to the ground proximity warning system, the accident would probably not have happened.

Memorial services will be held Wednesday at 0900.

Capt. Leonard Robinson graduated from the Air Force Academy in 1981. After completing UPT at Reese AFB, Texas in 1982, he flew C-141s with the 20 MAS, Charleston AFB, South Carolina. Since December 1984, Captain Robinson has been a T-37 instructor pilot with the Euro-NATO Joint Jet Pilot Training program at Sheppard AFB, Texas.

Clearing the Smoke

How the new C-141B smoke-and-fumes elimination checklist came to pass.

(Editor's Note—In February 1985, at McGuire AFB, New Jersey, MAC conducted the first inflight smoke and fume elimination test in the C-141B. Smoke-and-fume elimination procedures had not been evaluated since the initial testing of the C-141A years ago, and the safety investigation board convened because of the Sigonella mishap questioned their validity. As a result of that mishap investigation, C-141 crewmembers further questioned the validity of the revised smoke and fume elimination procedures. Capt. Harry Bombardi, a pilot assigned to the 30 MAS at McGuire AFB, decided he would attempt to answer some of those questions. This is his story.)

by Capt. Harry Bombardi
30 MAS
McGuire AFB, New Jersey

and

Maj. Bob Gee
HQ MAC Safety
Scott AFB, Illinois

I was working as a flight simulator instructor at the time of the Sigonella mishap and received a number of questions from crews on the smoke-and-fumes elimination checklist. Frankly, I just didn't have the answers. I wasn't sure our current checklist would work. So, I started asking some questions.

What I discovered was that the current procedures in the B-model Dash One hadn't been tested and there was no existing plan to test them. I then asked HQ MAC for permission to conduct "confidence training" in a static aircraft. Maj. Bob Gee, the C-141 weapon system safety manager at HQ MAC Safety, supported the idea and MAC approved the training. The ball was beginning to roll.

Back at McGuire, we formed a team of highly qualified crewmembers from a number of disciplines—training, safety, standardization, etc. The team we put together included: Maj. Joe Sticklickas, Maj. Duke Vargo, Maj. Art Brownell, Capt. Jim White, Capt. Doug Crouch, SMSgt. Jerry Eignor, and myself. With the help of the 438 MAW deputy commander for operations, Col. James M. Lacy; Col. Dale E. Stovall, the ADO; and Col. Alan Harris, 438 MAW/MA, we received permission to use a McGuire C-141 for the confidence training.

On 20 September 1984, we began our training. First, we pressurized the aircraft to 1.0 psi. A smoke generator in pallet position seven produced a cold, non-toxic "smoke." A short time after activating the system, the cargo compartment began to fill with smoke, the white vapor moving forward toward the flight deck and aft toward the aft cargo door. When we raised the aircraft's cabin altitude, some of the smoke cleared through the outflow valves.

TSgt. John Salisbury, 438 MAW, models the EEBD. Note the headset is worn externally as recommended.

Next, we placed the smoke generator in

Quick-don oxygen mask with goggles modeled by Maj. Wayne McKinnis.

the underdeck area. When the generator was started this time, smoke began venting through the battery vent and numerous other openings. Smoke didn't come up to the flight station until we selected max air flow for the flight station. When "max" was selected, the smoke from the underdeck area came up through the rudder pedals. With smoke on the flight deck and the flight station door closed, gasper air caused the smoke to swirl and spread. When we opened the flight station door, the smoke started to clear, but more smoke came up through the rudder pedals. What seemed to clear the smoke best was to depressurize the aircraft, open the number-one hatch, and go to "max" airflow for the flight station. This cleared the smoke rapidly from the flight station.

The confidence training raised even more questions. Why didn't such-and-such work? What happened to the airflow here? How does this contraption really work? We concluded that the only way to realistically evaluate the current procedures would be on an actual flight.

Armed with our confidence training results, I submitted an operational test and evaluation (OT&E) plan through command channels. Within two months, HQ MAC and the Airlift Center (ALCENT) at Pope AFB were prepared to start conducting in-flight testing of C-141B smoke and fume elimination procedures. The ALCENT test director, Maj. Jeff Grogan, chose McGuire AFB as the site of the testing because of our preliminary work on this problem. Assisting Major Grogan were test coordinators Capts. Wayne Krause and Ben Young. CMSgt. George Mark was the ALCENT test loadmaster. Test monitors included Maj. J.C. Parry, HQ AFISC Flight Safety; Maj. Bob Gee from HQ MAC Flight Safety; Maj. Wayne McKinnis and CMSgt. Bill Case from HQ MAC Stan-Eval; and representatives from the FAA Technical Center. Mr. Larry Bene from Lockheed-Georgia provided technical support to the team. Our test team from McGuire included Captain White and myself as the test pilots; and CMSgt. Dick Pothier and SMSgt. John Dodds, from HQ 21 AF Stan-Eval as the flight engineers. MSgt. Mitch Powell, 438 MAW Stan-Eval and TSgt. J.P. Salisbury, 30 MAS Stan-Eval were the test flight loadmasters. Maj. Joe Sticklickas would be on board to record the events on video tape for later analysis. Following along in a "chase" C-141 would be Lt. Col. Wayne Crowther, 438 MAW Stan-Eval.

The test program called for a two phase ground and inflight test of the current procedures and then some of the new techniques to validate or refine the procedures. The first phase was conducted on the ground in a cockpit procedures trainer (CPT), then in a C-141B simulator, and finally moving to the aircraft. The ground tests were used to

evaluate a new quick-donning oxygen mask and smoke goggles. The oxygen mask we used is an updated version of the current quick-don already in use, but the new one incorporates a valve that provides a small flow of oxygen into the goggles to keep them clear of smoke, or purge them of any trapped smoke or fumes. Trial runs in the CPT and the simulator with the test crew evaluated the ability of the crews to put on the smoke masks in simulated emergencies. The new quick-don mask and goggles were then tested for comparison. We found the new combination of masks and goggles a significant improvement over the old smoke masks.

The next step in the test took place in the aircraft and was similar to the confidence training we had completed earlier. We systematically tried new techniques while comparing each new one with the old procedure. We tried various combinations of hatches and interior airflow patterns, and each new thing we tried yielded new information.

We also tested an Emergency Escape Breathing Device (EEBD) for possible aircrew or passenger use. The EEBD is a loose-fitting, universal-sized hood which protects the entire head. It's flame resistant, has a solid-state oxygen supply that lasts approximately 15 minutes, and was designed to provide eye and respiratory system protection in a smoke or toxic fume environment. Test subjects received either very limited prior training to simulate that which a passenger would receive, or more extensive training if the test subjects were acting as loadmasters. Our testing with the EEBD even went so far as to simulate actual inflight duties wearing the hood.

Now armed with our ground test data, we were ready for the second phase—actual inflight testing. We flew four test flights with the non-toxic smoke generators in an overwater training area with our chase Starlifter. We flew them typically at 15,000 feet and 250 knots. All of the test participants wore the fire fighter's smoke masks for eye and respiratory protection. We tried both pressurized and unpressurized conditions, and all of our tests were documented with 35mm color slides or video tape.

Initially, the current checklist was used to establish some base line characteristics, and was shortly determined to be inadequate in effectively eliminating smoke and fumes in all situations. Some modifications were made to those procedures and found more effective.

One of the things we discovered was that using the emergency depressurization switch or shutting down both air conditioning packs caused smoke to migrate to the front of the aircraft. Use of both air conditioning packs provided more air flow and better ventilation than use of just the left pack alone. We also found that using both air conditioning packs in unpressurized flight provided better ventilation than did ram air alone. The pilot's ram air vent didn't effectively ventilate the aircraft when either pressurized or unpressurized. When we opened the number-two emergency hatch, it caused an initial surge of air toward the cargo compartment, resulting in a momentary clearing of smoke from the aircraft. But a pressure equilibrium, reached in about five or six seconds, resulted in no further clearing of the smoke.

When the number-one hatch was opened, there was an initial surge of smoke into the cockpit, and at one point, the entire cockpit was momentarily filled with smoke. But the smoke cleared from the cockpit in less than 10 seconds. The entire aircraft cleared in about two minutes. *(Editor's Note*--This was done *only* after the test crew was sure the smoke could be rapidly cleared.) As a result of all these tests, the team made several recommendations. Two of the most significant were procuring the new modified smoke mask and goggles for the aircrew, and revising the smoke and fume elimination procedures in the emergency checklist. The team was confident that the revised procedures would work.

As a result of this highly successful test, Lt. Gen. Robert F. Coverdale, MAC's Vice Commander-in-Chief, directed inflight testing of other MAC aircraft including the C-5 and the C-130.

This test, driven by squadron-level people who properly identified the problem and were supported by the wing, Numbered Air Force and headquarters staff, proves that the "system" can be used to effect change for the better. The "system" does work when important concerns about current procedures are properly routed to the headquarters. Not only do the people "upstairs" listen, but they respond quickly.

Flying Hour Milestones

CMSgt Muriel E. Wright, 4 MAS
SMSgt Robert L. Cain, 41 MAS
MSgt Henry E. Buchanan, 8 MAS

Lt Col Michael R. Davenport, 56 MAS
Lt Col Charles S. Joslin, 337 TAS
Lt Col James E. Kitts, 179 TAG
Lt Col Lawrence A. Marino, 20 MAS
Lt Col Willis J. Thayer, 176 TAG
Maj Richard A. Batsford, 56 MAS
Maj William D. Clinton, 176 TAG
Maj Ervin R. Hobbs, 176 TAG
Maj Phillip R. Ouimet, 4 MAS
Maj Gerald R. Lundberg, 728 MAS
Maj Edwin P. Jardine, 8 MAS
Capt Richard F. Reynolds, 6 MAS
Capt Brad G. Swingle, 756 TAS
Capt Thomas A. Wick, 301 MAS
CMSgt William R. Gillie, 9 MAS
CMSgt Omar Salazar, 8 MAS
SMSgt Gerald P. Slocum, 9 MAS
SMSgt Harold A. Walters, 179 TAG
MSgt Horst M. Beer, 56 MAS
MSgt Fred A. Booth, Jr., 9 MAS
MSgt Bernard A. Greene, 4 MAS
MSgt Wingate R. Kimbrough, Jr., 41 MAS
TSgt Reginald M. Browne, 6 MAS
TSgt Richard G. Collins, 9 MAS
TSgt Michael N. Dunlap, 9 MAS
TSgt Harold R. Handley, 8 MAS
TSgt Charles W. Hook, 6 MAS
TSgt Shelton Jones, 6 MAS
TSgt Henry N. Schulman, 41 MAS
TSgt Charlie L. Simes, 15 MAS
SSgt Eduardo Gonzales, 772 TAS
SSgt John L. Manning, 4 MAS
SSgt Carl D. Zirkenbach, 6 MAS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.

Flying the C-12F

Fast, roomy and easy on the ears!

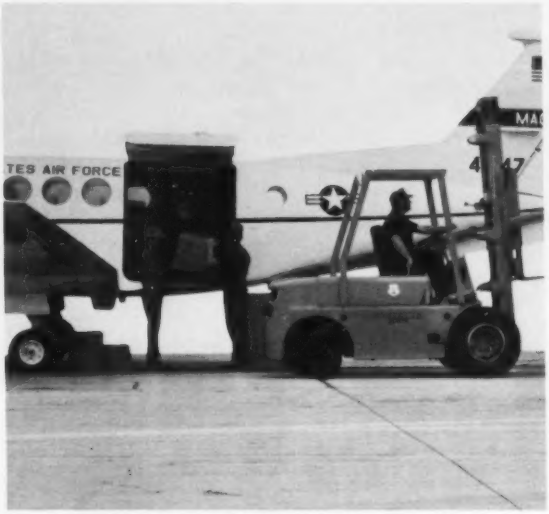
by Capt. Byron L. Howard
Associate Editor

Friends and fellow aviators, we are living in the age of the propeller. That's right! That prominent protuberance in front of an engine that makes lots of wind and changes power to a thing called "thrust" is alive, well and thriving. And it seems a turboprop is still one of the most economical ways to move people and cargo.

MAC's newly-acquired Beechcraft C-12Fs make up the second half of the operational support aircraft fleet (OSA) replacing the venerable CT-39 Sabreliners. Along with its stablemate, the Gates Learjet C-21A, the two make up a reliable and up-to-date fleet of aircraft ready and able to move small groups of people in safety and comfort. Here's a look at just how the C-12F is flown in support of this mission. *(Editor's Note*-- Our last look at the OSA fleet was "Flying the C-21A," *TMF*, January 1985.)

Recently, I had an opportunity to look over the shoulders of two pilots from the 1375th Flying Training Squadron, 375th Aeromedical Airlift Wing, as they flew an actual mission. Although the "real" mission of the 1375 FTS is training aircrews for the C-12F, C-21A, and C-9, they sometimes fly actual missions to maintain their proficiency and stay current on "real world" OSA situations. Maj. Mike Mobley and Capt. John Bertelsen flew as aircraft commander and copilot, respectively, on our flight from Scott to Pope to Maxwell and return. Both men are instructors in the 1375th, where Major Mobley is also the operations officer.

When I arrived at the aircraft, parked in a row with other gleaming white C-12Fs and C-21As, both pilots were inside just finishing up the before starting-engines checklist. They had just programmed the first navigation leg into the GNS-500A automatic navigation system. After engine start, we taxied out to a spot near midfield at Scott



The large combination cargo/cabin entrance door eases loading of litter patients or bulk cargo.

for an engine run-up. I asked why they did the engine run-up at this point rather than just before takeoff like most other propeller aircraft.

"Well, we kill several birds with one stone by doing the engine run-up now instead of later," explained Major Mobley. "First of all, by doing an engine run-up this early, we're able to find any maintenance problems before we've got a load of passengers on board. That way, we can either taxi back and get it fixed, or get a new aircraft."

"This also allows us to preposition the aircraft where our passengers will be," Captain Bertelsen further elaborated. "Besides that, the run-up checklist is quite extensive and takes an experienced crew between eight and ten minutes to do. While it's not uncomfortable for the passengers, it's time better spent prior to getting the pax on board rather than waiting until we've got a

load of people waiting to take off."

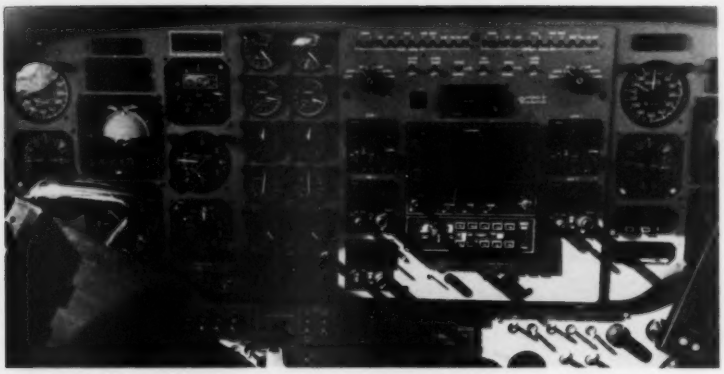
The run-up checklist for the C-12F, a "cousin" to the early model C-12A and the Beechcraft B-200, is certainly lengthy, too. Without going into detail, the major items on the run-up checklist include the following:

- Autopilot/altitude alert
- Overspeed governor and rudder boost
- Primary governor
- Vacuum and pneumatic systems
- Ground idle stop
- Autofeather system
- Manual feather system
- Surface deice system
- Prop deice
- Fuel vent heat
- Windshield anti-ice
- Pitot heat
- Stall warning heat
- Pressurization
- Radar
- Instruments and nav systems

There are several systems worthy of note on what most of MAC would call a "little" airplane. One is the GNS-500A automatic nav system. Basically, this gizmo uses a digital computer in conjunction with Very Low Frequency (VLF, 10-30kHz) signals to provide Great Circle Navigation capability to a known point. The radio transmissions come from the VLF U.S. Navy Communication stations and the stations comprising the Omega nav system familiar to most C-130 crews. Here's a short list of just what the GNS-500A will provide:

- Greenwich Date and Mean Time
- Present position coordinates
- Magnetic variation
- Stored waypoint coordinates
- Stored flight plans
- Departure time/time over last waypoint
- Bearing to waypoint
- Estimated time to waypoint (ETE)
- Estimated time of arrival (ETA)
- Desired track
- Drift angle
- Ground speed
- Track angle
- Cross-track distance
- Wind direction and speed
- HSI/CDI course display

When used with the Data Nav IV full color radar, waypoints can be projected right on the radar screen showing you exactly where your intended route of flight will take you vis-a-vis any weather that might happen to be in the way. I didn't know it then, but that was one feature we'd really appreciate before the day was finished.



Solid state and heads-up best describes the com/nav radios on the C-12F.

Maj. Mike Mobley, 1375 FTS ops officer, monitors instruments during engine start.

Along with the solid-state avionics in the C-12F, including dual VHF and VOR/DME radios, and single UHF, TACAN, HF and ADF radios, the aircraft incorporates a number of safety features to help with single engine operation. One of these is the rudder boost system. During normal flight, the rudder is manually operated. But if an engine quits at or shortly after liftoff, a pressure valve routes operating engine bleed air directly to the rudder, thus helping the pilot maintain control at a critical time. The Pratt & Whitney of Canada PT6A-42 engine and prop combination also comes equipped with autofeathering and autoignition. Capt. Jim Schneller, a 1375th IP, explained how these systems work.

"If something happens to the engine during takeoff and the torque drops below 400 foot-pounds, the autoignition actively tries to keep the engine going or get it restarted," he began. "If the engine is still failing below 260 foot-pounds, then the autofeathering system takes over and feathers the prop. At the same time, the system deactivates the autofeathering on the operating engine, so you don't get two engines feathered automatically." Both features are definitely desirable from a safety standpoint.

After engine run-up, we taxied to base operations where our passengers were waiting. Major Mobley briefed the four passengers at planeside as Captain Bertelsen went through the before-starting-engine checklist and requested IFR clearance to Pope AFB.

Taxiing in the C-12F isn't like the "big" MAC aircraft. Instead of a steering wheel, the pilots use the rudder pedals, via a system of bungee cords, differential brakes and differential power. Once cleared for takeoff, we lined up on Scott's runway 32. Captain Bertelsen then checked the prop control levers full forward and advanced the throttles to max power.

All in all, the C-12F accelerates similar to a C-130—a good strong feeling of acceleration without the kick in the pants of a small jet, like the C-21A for instance. But the climb to altitude was quick. The C-12F climb schedule calls for a speed of 160 KIAS to 10,000 feet, 140 KIAS to 20,000 feet, 130 KIAS to 25,000 feet, and 120 KIAS to 31,000 feet. After a couple of brief intermediate level-offs, we climbed quickly to our assigned cruising altitude of FL 310. Unfortunately, the ride was a bit choppy, so we asked for and received clearance to descend to FL 290 where we stayed until our descent into the Pope AFB traffic area. Enroute, Captain Bertelsen programmed the GNS-500A for the second leg which would take us from Pope to Maxwell. As we flew over Tennessee and into North Carolina, we began to see the thunderstorms both visually and on radar.

Our letdown and arrival into Pope were uneventful, and Captain Bertelsen flew an autopilot-coupled ILS approach to Pope's runway 23. Round-out and touchdown were aided with the manual trim wheel, and the rollout was extremely short—not more than 1,000 feet after touchdown—thanks to the low landing speed and reversible props.

After the passengers deplaned, we checked with base operations to ensure the second leg of our flight plan was duly recorded in the computer. Our next stop was the base weather shop to see how the thun-

derstorm activity was doing. To our chagrin, the thunderstorms were still there, right over Maxwell and most of Mississippi, Alabama and Georgia. But it looked like flying a northerly route around the stuff to Vulcan VORTAC (Birmingham) might get us into Maxwell behind the line.

After takeoff, this time with only one passenger, we climbed almost unrestricted to FL 280 and were cleared by Washington ARTCC direct to Spartanburg and flight planned route. As we approached Chattanooga, we were able to again see a fairly solid wall of thunderstorms south of our position. Several checks with Metro along the way confirmed that getting into Maxwell would be challenging.

Shortly after we passed Chattanooga, Atlanta ARTCC cleared us direct Vulcan VORTAC and direct to Maxwell. With the GNS, we were able to track directly to Vulcan VORTAC until receiving it. The thunderstorms were showing up in a prominent yellow color on the radar and the centers on a few of the returns were red. Still, thanks to the GNS capability of displaying the waypoints on the radar screen, we were able to stay clear of the CBs as we approached Maxwell.

About 30 minutes out of Maxwell, we started our enroute descent in visual conditions, and were able to stay clear of all weather with the help of our radar. A short stay, one more passenger and a little more fuel, and we were back in the air headed for an uneventful flight back to Scott.

The C-12F does a good job in the OSA mission. The interior is roomy, comfortably appointed, and provides adequate seating for eight people plus their baggage. The plane itself is well-equipped, has a good safety record, and handles crisply. As most of the pilots I talked with said, "in the air it'll turn . . . right now!" But the C-12 doesn't stop with just being a good passenger aircraft.

Within a short time of notification, the airplane can be configured for aeromedical airlift, carrying two litter patients and attendants. There is also a large (52" by 52½") cargo door located at the right rear of the aircraft in conjunction with the airstair door.

This is a versatile airplane, well equipped to perform the shorter legs of the OSA mission. The pilots like the plane and mission, and as the pilot force becomes younger and many new pilots head for the OSA mission, the C-12F will do a good job "seasoning" those lucky enough to get to fly it.

MAC's Newest Flying Squadron— A Look at the 1375 FTS.

It's a small squadron, but it has a big mission—training all the C-12, C-21, and C-9 pilots who come to MAC! It's also a very young squadron, having only been in existence for just a little over a year.

Until May 1984, the Central Training Facility of the 375 AAW conducted all the training for CT-39 and C-9 pilots. But when MAC started phasing out the CT-39 in favor of the C-12F and the C-21A, some changes were in order. For one thing, pilots chosen to fly the new aircraft receive their initial ground school and simulator training through a commercial aviation training organization, Flight Safety International. But what about the actual flight training?

Enter the 1375 FTS. Under the command of Lt. Col. Vic Williams, the newest squadron in MAC has grown slowly but steadily to its present complement of six C-12 instructor pilots, six C-21 instructor pilots, and an admin and training staff. It also has four dedicated C-21As and four C-12Fs with which to train the newly assigned pilots. The squadron conducts both initial and instructor pilot training.

But the squadron's responsibility doesn't stop with teaching pilots to fly two new airplanes. The 1375th also has the responsibility for operating the 375 AAW's Learning Center, used by all Scott AFB personnel. In addition to that, the 1375th also conducts the C-9 pilot's ground school.

"This is a selectively manned unit," remarked Major Mike Mobley, the 1375th's operations officer. "We're looking for the most highly qualified, motivated and experienced people we can find." If an assignment to the 1375 FTS sounds like just the thing you've been looking for, feel free to give them a call at AV 638-2344. In fact, the 1375th is to C-12s and C-21s what Altus is to C-141s and C-5s, Kirtland is to is to rescue, and Little Rock is to C-130s—the "schoolhouse" for OSA!

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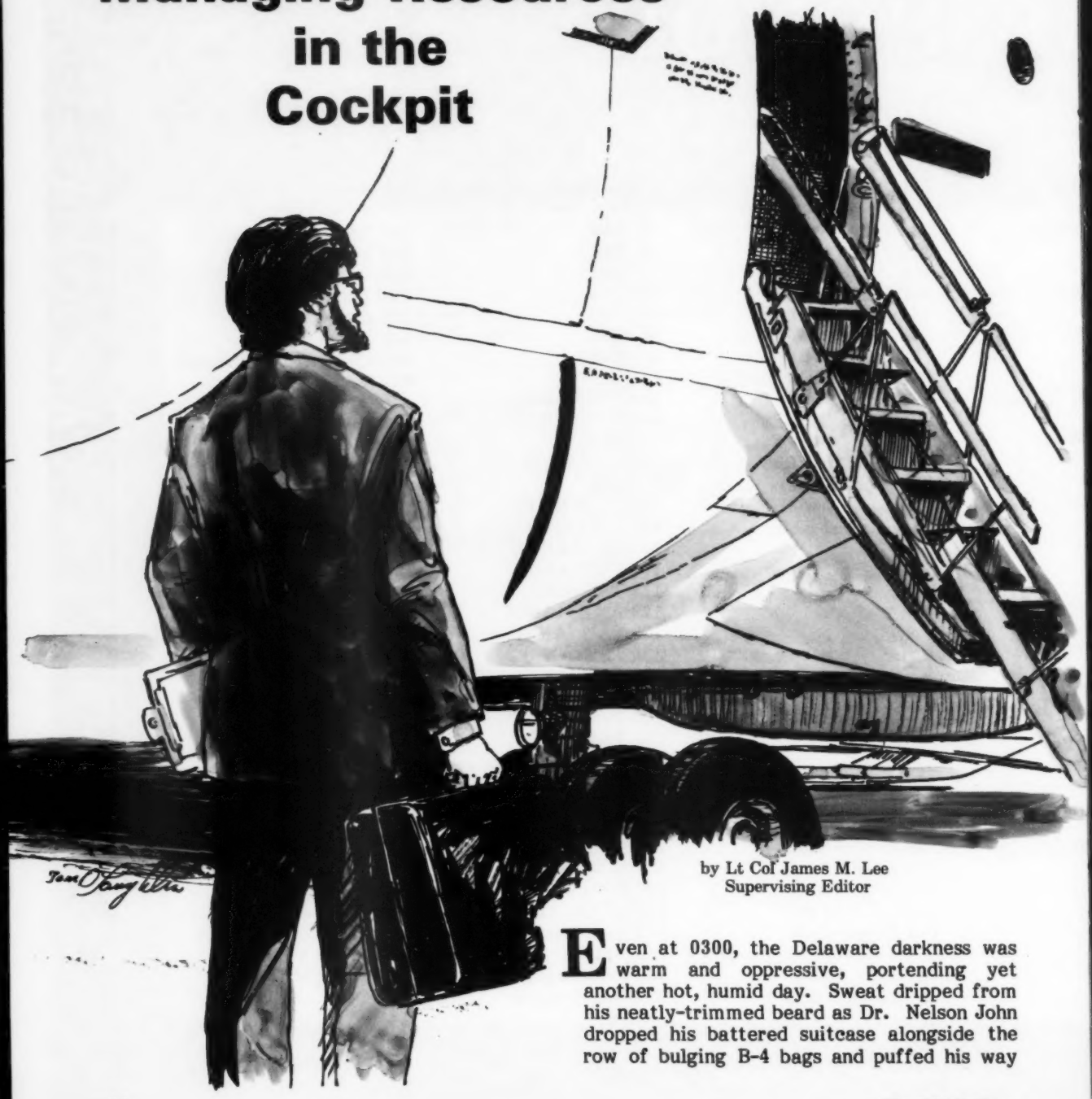
A Researcher Learns About . . .

Managing Resources in the Cockpit



by Lt Col James M. Lee
Supervising Editor

Even at 0300, the Delaware darkness was warm and oppressive, portending yet another hot, humid day. Sweat dripped from his neatly-trimmed beard as Dr. Nelson John dropped his battered suitcase alongside the row of bulging B-4 bags and puffed his way

into the squadron building. Wearily, he rubbed his eyes and slipped into a seat in the aircrew briefing room. "Why me?" he mumbled aloud. "Why always me? Not only have I spent the last six months flying the line with commercial crews, but now I have to do the same with a military C-5 crew. I suppose this will be another 'sit down, shut up, and do as I say' briefing." Dr. John had heard more than his share of these in the last six months. He groaned and rolled his eyes upward as the aircraft commander entered the room with the remainder of his crew. Lt. Col. Joe Robert was the visual stereotype of a military officer, complete with closely cropped hair and an obvious air of authority. John stood up, stretched to his full 6-foot 4-inch height and ambled to the front of the room for the usual round of introductions.

"Colonel Robert, I'm Dr. Nelson John. I assume your commander told you I'd be flying this mission with you?" He asked the question with a touch of irony, knowing how often such messages never got passed along to the crews.

"Glad to meet you. I'm Lieutenant Colonel Joe Robert and yes, we got the message you'd be along for the ride." Pointing to a lanky, blond-haired lieutenant, he began to introduce the crew. "This is Lt. Chris Scout, our copilot. The flight engineers here are SMSgt. Brian Douglass and SSgt. Don Rose. These folks are the loadmasters. I'd like you to meet MSgt. Tom Whit, SrA. Fran Wells, and TSgt. Tommy Ola. SSgt. Les Byron here is our crew chief."

Returning to the podium, he continued. "This is Dr. Nelson John and he's going to accompany us on our trip. He's doing research on crew coordination or something like that. Dr. John, would you like to give us a quick overview of your project before we start the briefing?"

The young researcher rubbed his beard as he leaned against the podium. "Gentlemen—excuse me, *lady* and gentlemen—I'm doing research at the request of the Military Airlift Command. I've spent the past six months flying all over the world with commercial flight crews. Now my associates and I are going to spend about three months looking over your operations. What we're doing, quite simply, is collecting data on how crews communicate and use the various resources at their disposal. I'll be sitting in the jump seat, monitoring how you all get the job done, and taking lots of notes, so please don't get all excited. And one more thing, this isn't a checkride, so I won't be briefing your commander. Also, the data we gather is carefully protected to guarantee absolute anonymity for the crews." He smiled as audible sighs of relief filled the small room. "I'll want each of you to fill out a short questionnaire at different times during the trip, but I won't bother you in any way during the flight. Any questions?" He looked searchingly at the non-committal faces in front of him. "Thanks, colonel," he said and took his seat.

"Guess that's clear enough," Colonel Robert said, smiling at his crew. "Let's see that Dr. John gets all the data he needs. If you're ready, I'll complete the premission briefing so we can make our departure time."

Fifteen minutes later, Dr. John shook his head in grudging appreciation. Despite the appearance of being "Mr. Military," the colonel had clearly set the stage for a successful mission. He'd spent a lot of time on the usual details, but it was his final remarks that had caught the attention of the researcher. Colonel Robert had not only requested feedback from his crew during the mission, but he'd made a big point of emphasizing how important honest communication was—and between *all* crewmembers. Robert had also taken extra time to explain that each crewmember could very well play an important role in any aircraft emergency and that he'd be depending on each one for assistance if a problem arose. The researcher finished writing his observations as the crew bus pulled alongside the C-5.

Despite his air of casual indifference, Dr. John was impressed. He'd read all about the C-5 in preparation for the series of flights, but he'd been totally unprepared for an aircraft this big. "I wonder how this monster gets airborne," he whispered as he began the climb to the flight deck. Moments later he stood on the bustling flight deck of the Galaxy and got his first look at the crews' "office." He had to admit it was very impressive. Subconsciously, the C-5 crew moved up a notch in his crew rating.

Throughout the preflight preparations

John noted the steady flow of information to the aircraft commander. First, the crew chief briefed Robert on the status of the aircraft and the minor maintenance problems that remained to be fixed. Then one of the loadmasters arrived with the weight and balance sheet. He carefully explained the figures to the colonel before obtaining the needed signature. Next, the engineer handed some takeoff and landing data computations to the copilot. After carefully checking the data, Lieutenant Scout had handed it to Colonel Robert for his final review. The researcher made a cryptic note. "Preflight information flow good—everybody involved—communication going both ways."

"Everybody on headset, briefing in five minutes." Colonel Robert's "heads-up" call to the crew was not unlike that of his commercial counterparts.

The takeoff briefing was thorough and professional and John, sitting in the jump seat, made numerous notes. He was impressed the colonel gave such detailed assignments for the takeoff, including specific guidance on how a reject was to be called and handled by the crew. The AC also gave instructions as to which crewmember was to monitor which radio and so on. Colonel Robert left nothing to chance, and completed his briefing with a thorough review of procedures to be followed in the event of an emergency return. The researcher nearly dropped his pencil in surprise, though, when the pilot asked if his crew had questions and got an immediate reply.

"Pilot, engineer. Sir, the EPR is supposed to be 2.45 for takeoff, not 2.54. I must have transposed the figure. Sorry."

The pilot turned and glanced at the engineer as he briefed the amendment to the power setting. "That's your mistake for the trip, engineer. You too, copilot," he needled the embarrassed duo, with a smile and no animosity. "Anybody else got a question?"

Dr. John nodded approvingly as several other crewmembers spoke up on interphone asking for further clarification on the departure route and emergency return procedures. He wrote busily as the aircraft commander calmly answered each question in turn.

The remainder of the before-takeoff procedures went like clockwork as the copilot deftly directed the completion of each checklist. John noted the young lieutenant seemed to know his job and was not afraid to correct an improper checklist response from any of the crew—including a certain lieutenant colonel who had put in the wrong altimeter setting, eliciting a soft hiss from the engineer station. Soon though, they were at the end of the runway and in spite of his nearly 2,500 flying hours, Dr. John felt his stomach tighten as the pilot smoothly advanced the Galaxy's four throttles and released brakes.

"Go!" The copilot quickly scanned the instruments as he made his required call.

"Rotate!" Colonel Robert pulled back on the yoke and gently lifted the nose of the C-5 into the air.

Seconds later, the huge airlifter was airborne and Dr. John began to breathe more easily. "You'd think I'd get used to this," he dutifully noted on his log as he watched the pilot and copilot methodically scanning ahead of the aircraft, with regular glances at the instrument panel.

Dr. John happened to be the only one looking outside at the exact moment the flock of ducks flashed by the C-5's left wing. He was so surprised he could only point as he fumbled awkwardly for the interphone switch. The audible thump told him his warning was too late, so he ceased his efforts to talk and began to watch the crew with complete concentration.

"What was that," was Colonel Robert's first remark as he looked anxiously at his engine instruments. "Sounds like we hit something. Engineer, everything check out back there?" Robert sounded concerned, but calm.

"Pilot, engineer." The reply was nearly instantaneous. "We got a problem with the number-one engine. High TIT and the MADAR's showing excessive vibration. Whoops, there's the fire warning!" Things got very busy from that point.

"Fire handle pulled, agent discharged!" Robert rattled off the bold face procedures as he pulled the number-one engine T-handle and discharged the fire bottle. That completed, he called for the emergency engine shutdown checklist, carefully complying with the departure instructions. The researcher noted the colonel was very busy, not overwhelmed—yet—but definitely approaching task saturation.

"Checklist complete." The copilot's remark triggered a change in Robert's actions as he gave a series of orders to his crew. "Copilot, get us clearance for an emergency return. I'd like vectors for the ILS to runway 01.

"Engineer, monitor number-two engine. We might have hit a flock of birds. Take a look at the emergency return data, too, when you get a chance."

"Scanner, pilot. We just lost number-one engine, so how about taking a good hard look at number-two, just in case."

Having gotten his crew organized and headed in the right direction, he continued to fly the Galaxy, following the instructions of the air traffic controllers. The concerned jump seat occupant noted the colonel was concentrating on his flying, apparently with complete confidence in his crew.

Moments later, when things had settled down a bit, Robert transferred control of the aircraft to the copilot and began to prepare his approach briefing. Dr. John noted the colonel got input from nearly every one of his crewmembers during this time, yet seemed sufficiently free from distractions to be able to listen carefully to the information they were providing.

"Crew check in for the approach briefing." Robert seemed organized and totally in control, despite the situation. He proceeded to give a detailed briefing, again assigning crewmembers specific tasks, including which radios to monitor. He concluded the briefing with a thorough discussion of their emergency, the procedures to be used during the approach and landing, and a review of the systems affected by the failed engine. Again, he asked for questions from his crew. This time, though, there were none.

"Pilot's aircraft," he said to his copilot. "See if approach control will give us an extended downwind so we can get the rest of the checklist procedures complete. We won't have to rush that way." Lieutenant Scout quickly complied and soon had the clearance, just as his AC had requested.

The remainder of the short flight was thoroughly anticlimactic. "No sweat!" was the cryptic entry on the research log. Soon the Galaxy was back in its parking place and the crew was standing around looking at the badly damaged number-one engine. The feathers imbedded in the dents gave silent proof of the cause. Dr. John continued to monitor the crew's reactions until the aircraft commander tapped him on the shoulder.

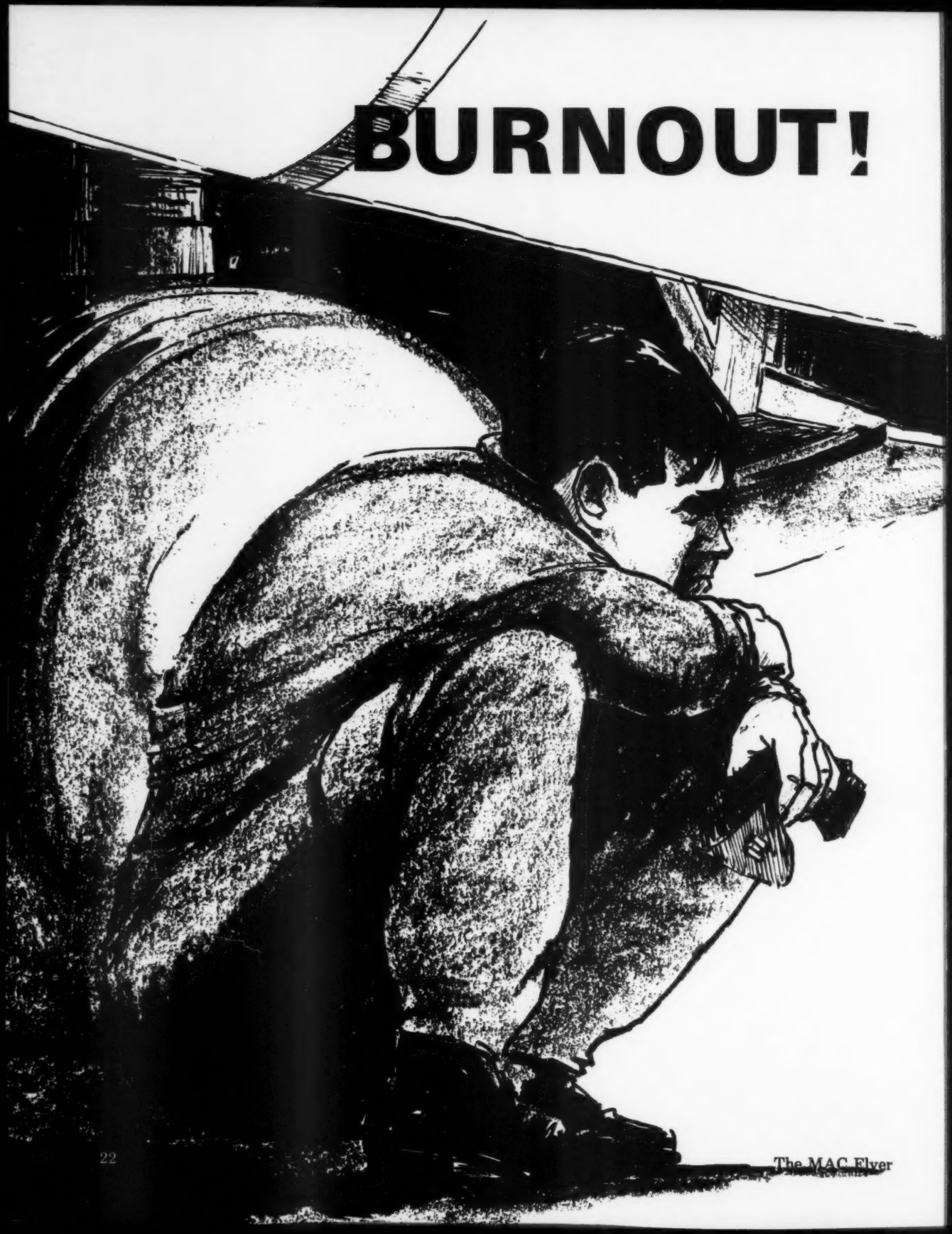
"Sorry to tell you this, Dr. John, but our mission has been cancelled. By the time we'd get the load swapped to another aircraft we'd be too late to get into our destination before the start of quiet hours. The scheduler said he'd get you on another flight tomorrow. I apologize for the inconvenience and the excitement, but you just can't predict when a flock of ducks is going to make a suicide run at your aircraft. By the way, how'd we do—that is if you don't mind telling us?"

"Colonel," the researcher began with a smile. "If I was writing a book on the management of resources in the cockpit, this flight would be included. You and your crew gave an admirable demonstration of how it *should* be done. You had excellent communication between yourselves, and you set that up beautifully by encouraging feedback and questions. They caught a couple of minor mistakes, too, didn't they?" The bearded civilian grinned at the blushing colonel. "But if you hadn't encouraged your crew to question things, you'd have never gotten that feedback—and all feedback is important," he continued as they headed for the crew bus.

"The engine fire really gave me a good look at how you all handled task saturation. In my opinion, you handled it very well. Remember, you were very close to being overloaded, but you finally asked for assistance and got it. You all worked together, used every bit of equipment on board, and even got the guys on the ground involved. All in all, a first rate effort! I just wish all the crews I flew with were as good at communicating and using their resources as you and your crew are, but that's the reason we're doing the research. We're developing a system which considers individual personalities and group dynamics and uses that to teach effective communications to crews—helping them make maximum use of their resources."

Stepping off the bus, battered suitcase in hand, Dr. John stopped and smiled. "Nothing personal, guys—and gal—sorry. But couldn't you schedule some of your flights during daylight? These 0200 alerts are *killing* me!"

BURNOUT!



by Col Rich Pilmer
Chief, Human Factors Analysis
HQ ARRS
Scott AFB, Illinois

Don't all individuals sometimes try *too* hard? What is called maturity, poise, or cool in professional athletes and performers is the ability to get emotionally and physically "up" at *just* the right time. Equally important is their ability to relax and regroup when the contest has finished. But what happens when the unrelenting pressure to do more and better leads to total burnout, or what some call breakdown or overextension?

Let's say that in 1985 you got into an aerobic fitness program, and you've already started doing more situps in preparation for the tougher AFR 35-11 standards. You gave up smoking, have eliminated greasy, cholesterol-laden foods from your diet, and your weight is optimal for your frame. You feel like a million! There's no job you can't handle, and no problem is too tough!

Unfortunately, it's necessary to point out that sometimes, in the midst of all this fitness and success, a super achiever like yourself can become a victim of overwork. You're seemingly so healthy that you can't hold yourself back! This condition, which we hear more and more about in modern America, surfaces in politicians, entertainers, and athletes as well as in teachers, lawyers, and doctors. In short, no matter what your occupation, the pressure to succeed often predominates. But what about us in the Air Force? Up or out, careerist workaholic, fast burner—these are all related, well-known terms for a lot of blue suiters.

In recent times, stress by itself has been covered in medical literature to the point of overkill. Stress, tedium, and burnout undoubtedly overlap, but burnout has some unique characteristics.

Life emergencies may produce high levels of external stress and resultant short-term burnout but more commonly, burnout is a *chronic* internal condition that may climax in a sudden flare-up and precipitate an accident. In his monograph, *Burnout: The High Cost of High Achievement:* what it is—and how to survive it, Dr. Herbert Freudenberger defines the process of burnout this way:[1]

> To gradually exhaust one's physical and mental resources. To wear oneself out by *excessively* striving to reach some unrealistic expectation imposed by oneself or by the values of society.

There is an old adage that medical students are prone to develop (or at least imagine) nearly all the symptoms of syndromes they study in the process of becoming professional doctors. Flyers, too, may sometimes fall victims to insidious ill-defined psychic factors that lead (or cause them to think they might be leading) to a shortcoming in basic flying skills. These are variously described as channelized attention, get-home-itis, lack of situational awareness, or (more bluntly) "dumb mistakes." It's not simple to clearly define the causes of human error. Lack of rest, chronic fatigue, situational maladjustment, or burnout probably once again overlap, and all share some common psychological and physiological functions. They've all been discussed before in flight safety literature.

Two short excerpts are reprinted here to illustrate the need to update this subject. One is from a classic work in aerospace medicine. The second is from a late 1983 unclassified safety message. Let's start with the latter.

> Several recent accidents have involved chronic fatigue and were possibly exacerbated by highly motivated or "can do" aircrews and their desire to excel. This mindset either precludes recognition of fatigue or greatly reduces the probability of crews taking themselves off of the flying schedule, despite continued assurance by supervisors that it is acceptable to do so. As a result, they *pass a point where even a relatively minor unplanned event can overtax their abilities* and lead to a mishap. Strong, active supervisory involvement and support of the concept to "take a raincheck" for a sortie is necessary.

The people written about in this excerpt *were not* chronic dunderheads. They were top guys who were simply overworked. Burned out.

Flight surgeons have been aware of the need for regular and complete escape from

flying for years. Witness this 1962 passage from a master flying doctor, the late Harry G. Armstrong.

> The cumulative need in flyers for prolonged opportunities to secure needed rest and relaxation should be a subject of special aeromedical attention. Airmen engaged in active air operations should avail themselves of their full allocation of vacation and leave time. This is generally from 15 to 30 days each year with full pay. It's been found that individual duty performance is improved when flyers *take sufficient leave at one time*, such as from 10 to 30 days. For them to adequately profit from a temporary respite from flying duties and a change in environment, flight surgeons should advise at least a 10 day vacation every 6 months.[2]

While duties sometimes preclude the availability of protracted leaves, there is also a tendency of service members to use their leave sparingly, a few days at a time, without taking a vacation. Workaholics may use leave to work on other projects, finish schoolwork, PME, etc., rather than taking a period to really relax, and get away from the demands of success.

How does the literature define the transitional symptoms of burnout which occur *before* tragedy strikes? There may be physical, emotional, mental or a combination of changes that gradually surface in the individual.

- High energy people can become chronically tired.
- Cooperative people become constantly irritated.
- Well-organized people become forgetful.
- Safe operators becomes accident-prone.
- Resistance to illness decreases.
- A Positive attitude becomes "who cares."
- Work changes from sheer joy to sheer tedium.
- People may even begin to comment on apparent changes in appearance and "broken spirit."
- Afflicted individuals often have little to say to people.
- People may have the feeling their work is harder but the accomplishments are lesser.[3]

Fortunately there are things about service life that tend to offset the development of burnout. Dr. John H. Johns writing in *Military Family*[4] cited these factors that promote mental health in military families:

- Availability of resources.
- Strong interpersonal relationships.
- Effective skills to meet challenges.
- Spiritual and ideological commitment.
- A sense of stability.

Nevertheless, if work, home, or parental pressures cause you to approach burnout, or at least some of the symptoms, take these steps:

1. Monitor yourself.
2. Carefully reevaluate your goals and construct balanced, realistic schedules of attainment.
3. Be alert for slow changes in the way you interact with people.
4. Gradually reduce any (legal) high stimulation drugs you may have "temporarily" adopted to maintain your "crisis oriented" operation. Many people have become addicted to legal (and sometimes illegal) drugs not as derelicts, but as idealistic overachievers trying to get ahead.
5. Finally, if you're suffering from any of the symptoms of burnout, see your friendly local health care professional. They really can help!

1. Herbert J. Freudenberger and Geraldine Richelson, *Burnout: The High Cost of High Achievement:* New York: Doubleday Co. 1981.

2. Harry G. Armstrong, et al, *Aerospace Medicine*, Baltimore: Williams and Wilkins Co., 1961, PA. 526.

3. *Burnout, From Tedium to Personal Growth*, Pines, et al., New York: The Free Press, 1981.

4. Dr. John H. Johns, Asst. Sec. Defense, "Performance and Readiness Tied to Lifestyles," *Military Family*, Nov-Dec, 1983.

C.R. Terror

Will the Lockheed Lothario be late with the limos?

MAC 60214, MAC 60214, this is command post. How copy, over?"

"And then, Sammy, I ordered the *best* bottle of champagne on the wine list. You should have seen Tassels' face when the waiter brought out the chateaubriand for two. She was really impressed! Sammy, m'boy, you've just got to learn how to treat the ladies." C.R. Terror felt obligated to advise his ace copilot, Long Suffering Sam, on all aspects of life.

"Hey, Boss, tell us again how you felt when the manager of the Chalet Villa refused to accept your credit card," Max Torque interjected.

"A simple computer error, my dear Max. The manager quickly agreed to an easy monthly payment plan and escorted us to the door," Major "T" answered as his face began taking on the color of a fine rose wine.

"MAC 60214, command post."

"Besides, we were able to top off our meal with a very fine apple turnover down the street, which I consider in many ways to be a lighter and more delicate dessert than the heavy Baked Alaska we left sitting on the table at the Chalet Villa.

"MAJOR TERROR, COMMAND POST!"

"Command post, Major Terror, er, MAC 60214 here."

"Roger, standby for a phone patch with Colonel Fang."

"Terror, are you there?" the unmistakably menacing tones of the wing DO made C.R. literally jump to attention from the "enroute position" he had been maintaining.

"Y-Y-Yes sir. Major Terror here."

"Good. Now listen carefully. I want you to proceed to Grassy Plains Regional Airport, pick up a load of five limousines and transport them to Golden Nugget AFB. And Terror, this is a very important mission. The cars must be in place at exactly 0500Z. It's essential you don't blow this one." Colonel Fang's voice began to tremble slightly as he realized the infinite number of ways C.R. could ruin this mission.

The Rotund One, raising the sleeve of his custom-tailored flightsuit, checked his Rolex Oyster Perpetual Chronometer and realized he had a mere seven hours to reach his destination.

"Yes, sir. You can count on me, er, us to get the job done." C.R. sounded confident, but then he always sounded confident, often failing to realize the gravity of any given situation.

"Where is Grassy Plains Regional Airport, Boss?" Sammy asked sporting a confused look on his face.

"Two hundred miles due south of our position, m'boy," the Nimrod of Navigation shot back without hesitation. Soon the Galaxy's mammoth nose was cutting a path due south heading for Grassy Plains Regional.

As the giant bird began its descent on final, the NDB

needle was wired exactly on the 322 degree bearing called for on the approach plate.

"One hundred above. Minimums!" Sammy called as his head swiveled about looking for anything resembling the runway environment. "Runway in sight!"

"Roger that, Buck-O. Going down," C.R. called as he continued his descent.

"A perfect landing, Boss," recounted Max, appearing pleasantly surprised as the Galaxy gently kissed the asphalt.

"As always, my dear Torque," the Guru of Grease Jobs boasted, "and there's our cargo on the east ramp."

"Will you look at those limos, Boss. They're flawless," Ty Downs spoke, as he got his first glimpse of his load-to-be.

"Absolutely Ty, and we're going to see they remain so," C.R. remarked, acting as if he'd done this all before.

The high priority cargo was soon aboard and secured. Three hours had passed since Colonel Fang's initial call as the Galaxy's giant TF-39 engines whined their way down the runway. C.R. realized he had but four hours to reach Golden Nugget and he would need every minute of it to make his scheduled arrival time. One mistake and the party would be over.

The Galaxy performed flawlessly as it headed into the setting sun, but the arrival time was too close to call as the craft began its descent.

"Boss, looks like the weather at Golden Nugget AFB is no problem. It's clear and 10 miles visibility with light, southerly winds," Sammy spoke excitedly, realizing that the cargo would most likely reach its destination on time.

"Absolutely superior, Sammy m'lad," C.R. spoke with visions of "attaboy letters" dancing in his head. "Just to be on the safe side, Sammy, we'll request a visual approach. That'll save us an *additional* 10 minutes."

"Roger, Boss," the dutiful copilot responded.

"MAC 60214, turn left heading 245 degrees. Golden Nugget is at 12 o'clock and 15 miles. Report the air base in sight."

Sammy and his mentor both strained to pick out the air base which was well camouflaged by the bright lights of the city that never sleeps.

"There it is, Sammy, at 10:30 about 10 miles out. Cancel IFR!" the Airways Airedale directed, having matters well under control.

"But, Boss, the TACAN still shows us 15 miles out and . . . ," Sammy tried to correct.

"Slant range, Sammy m'boy, slant range. That's the base right there. Now, cancel IFR!" C.R. was like a man possessed.

"Roger, Boss," Sammy answered with more than a little hesitation still in his voice.

"MAC 60214, understand cancel IFR. You're cleared to land runway 25 at Golden Nugget. Contact the tower after landing. Good night."

"Okay, Sammy, we've got rollers and flaps. Checklist complete," C.R. announced, realizing he had this mission in the bag with 15 minutes remaining on his block time. "Looks like the old VASIs are out of service. That could be something of a problem for a less experienced pilot on a dark night like this."

"Boss," Sammy queried nervously. "Are you sure this is Golden Nugget. The runway looks too narrow to be . . . ."

"Sammy, Sammy, Sammy. Didn't you read the *TMF* article on visual illusions last

month. What we have here is the infamous 'black hole' effect. Oof, a little firm on the landing there, crew. I guess I misjudged the flare a bit. After landing checklist and contact tower, Sammy," C.R. directed as he slowed the large craft and began looking for someone to meet his precious cargo.

"I don't see anyone, Boss, and I can't seem to raise tower or ground control on the radio," Sammy remarked as he scanned the poorly lighted tarmac for any sign of life.

"Well, we'll just head up towards the operations building," C.R. mumbled, sounding a bit confused.

As the giant machine turned to face the operations building, C.R. and Sammy simultaneously felt a cold chill and a sinking feeling in their stomachs as the landing lights cut a path across the operations building and they read the words "Welcome to Southview Airpark—Elevation 512 feet."

C.R., with his amazing grasp of the obvious announced, "Criminently Sam! We're at the *wrong* airport."

Within seconds, charts and enroute supplements flew wildly about the flight deck as the ill-fated crew attempted to pinpoint their position.

"Here we are, Boss. On the low altitude chart. We're about seven miles southeast of Golden Nugget," the Reticent Rightseater called, placing his trembling finger on the spot depicting the airpark's location.

"Quick, Sammy, contact approach control and get a clearance to Golden Nugget," C.R. directed. "Max, work a TOLD card—quick!"

"But Boss, we cancelled our flight plan. What if they want us to refile?" Long Suffering Sam asked, feeling the effects of executive stress.

"Talk very nicely to them, Sammy" C.R. answered, "And if you have to—*beg*!"

"Right, Boss," Sammy said as he sprang into action. Within minutes, the whining engines once again pulled the C-5 skyward into the darkness.

"MAC 60214 heavy, say type approach requested at Golden Nugget," the approach controller queried scarcely able to contain his laughter over the radio.

There was a moment of silence on the flight deck then, simultaneously, C.R. and Sammy responded in their best radio voices, "ILS!"

The 24 main tires screeched as they once again found terra firma, and C.R. slowed the C-5 to taxi speed. He could already see the follow-me truck waiting to lead him to a well-lighted area of the Nugget ramp.

The Field-grade Fumbler felt dejected as he had, once again, snatched defeat from the jaws of victory by arriving one hour late with his high priority cargo.

Almost as quickly as the Galaxy was parked, Ty Downs and his team of loadmasters opened the visor and knelt the large craft to the off-load position. While Ty and the other loadmasters off-loaded the limos, assisted by several men dressed in business suits, another man approached C.R. on the flight deck with a scowl on his face. C.R.'s Air Force career, or rather what was left of it, passed before his eyes in an instant as he knew he was about to die. With his hands outstretched defensively, he began to speak, "I know we're an hour late and I . . . ."

"I just wanted to thank you for your hard work,Major Terror. Colonel Fang told us you'd be here exactly eight hours after initial notification at 0600Z but very few of us believed it, realizing how far you had to travel today," the stranger said shaking C.R.'s outstretched hand.

"Zero six zero zero! Colonel Fang told you 0600Z?" C.R. asked.

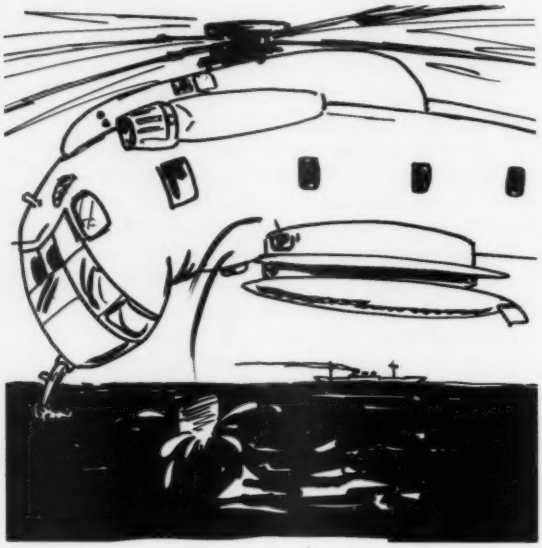
"Absolutely. He called us right after he got the phone patch with you this morning," answered the stranger. "Colonel Fang seems pretty sharp, but I guess you don't become a wing DO, by being a dummy." Obviously, the stranger knew nothing of C.R.'s faux pas and Major "T" saw no particular need to enlighten him. "You can refuel and return to Homeplate AFB whenever you're ready," the stranger said as he left the flight deck. "And thanks again."

Within minutes, the five limos were safely offloaded and sped off into the desert night.

"Well guys, I guess we did all right. Not a flawless mission, but then no mission ever goes perfectly. Minor problems often arise during such a demanding mission, but when the going got tough, the . . . ," C.R. was on a roll and couldn't be stopped.

Sammy, Max and Ty all rolled their eyes and headed off into the darkness towards the flightline snackbar to grab a Nugget burger before the long flight home.

Quick Stoppers

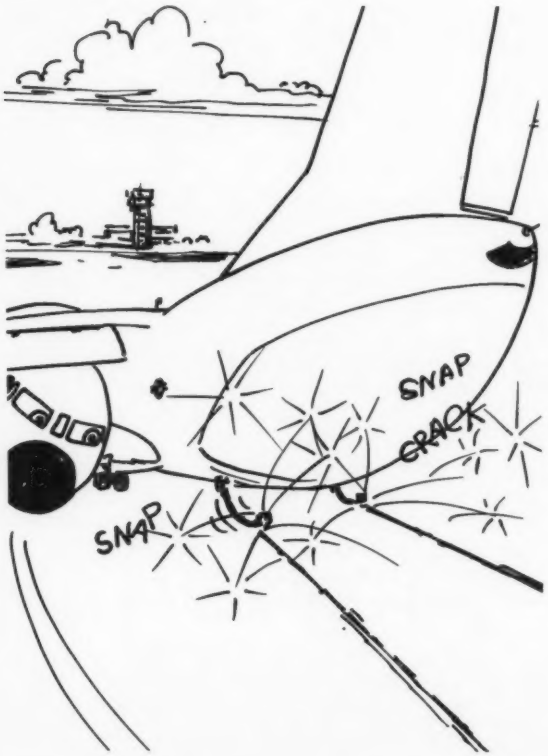


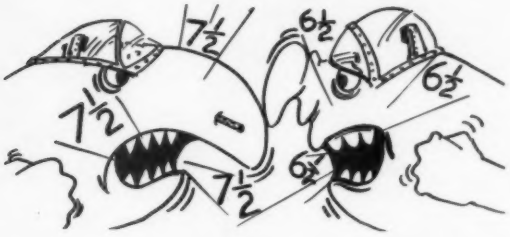
Stowed . . . Away!

A non-MAC HH-53C was hovering during an attempt to rescue an injured person off a ship when the flight engineer noticed the left sponson work platform was out of the stowed position. After trying unsuccessfully to stow the platform, the crew decided to tear it off to avoid further damage inflight. During the process of removing the platform, it broke free and fell into the ocean. The crew completed their mission and returned to base where an investigation showed the latches on the work platform had released inflight. Aerodynamic pressures then opened the platform and exerted enough force to break one of the hinges. Although rotor wash made it virtually impossible to stow the platform, had the crew managed that trick, they still would have been unable to close the latches.

Strutting Yer Stuff

A Starlifter crew recently lost a lot of faith in humanity, gained new insight into the meaning of responsibility, and learned a painful lesson about checklist discipline. It seems the C-141 was scheduled to airlift a mixed load of pallets and rolling stock in support of an exercise. Due to problems with the load weights, though, the aircraft exceeded the scheduled ground time. At this point, the loadmasters asked the load crew to stow the loading struts while they finished their preflight tasks. After securing the cargo, neither the loadmasters nor the scanner checked to see if the struts had been properly stowed, and the aircraft was soon started and on the active runway. When the Starlifter landed at the destination, the ALCE team approached the aircraft to unload it and discovered the strut doors open and the struts missing. It took only one phone call to locate the missing struts, which were found near where the aircraft was loaded at the departure base. The struts were never stowed, the aircrew failed to note this fact despite checklist guidance to do so, and the struts broke off during the taxi for takeoff.





What I Meant Was...

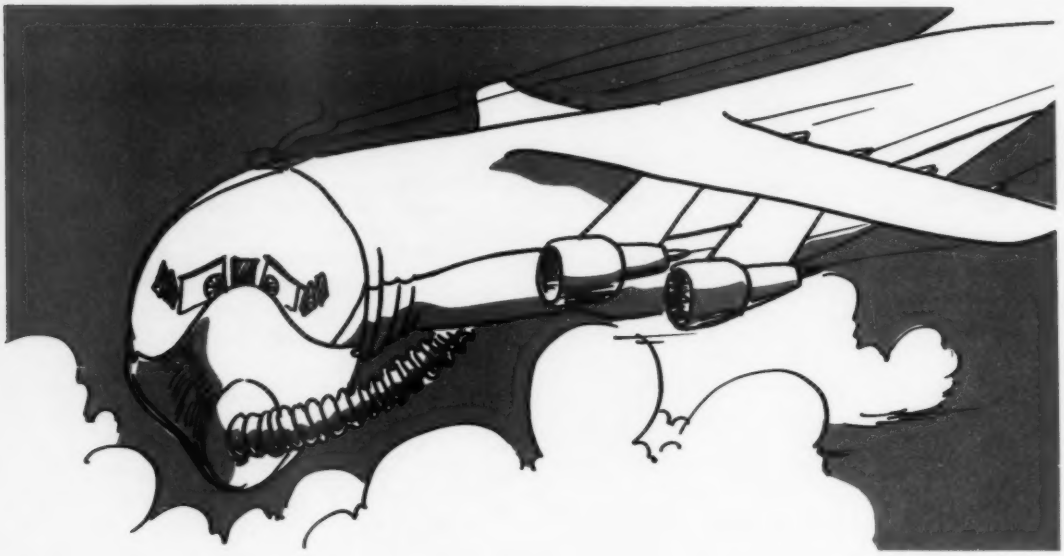
The two ship formation was maneuvering for approach when the lead pilot discovered his aircraft had experienced utility hydraulic failure. The pilot declared an in-flight emergency during the turn to ILS final. His wingman continued in trail with his own ILS approach. Following handoff to final approach control, lead requested pickup for a PAR. At approximately 6½ miles from touchdown, the controller asked lead to verify he was indeed at 6½ miles, to which the lead pilot responded that he showed 7½. As the PAR continued, the controller requested lead verify he was going for the left runway, which he did. At 1½ miles from touchdown, lead broke out at 500 feet, 1½ miles *right* of both runways. He expressed his dismay, and the controller indicated the target still appeared to be on-course and on glideslope, a tribute to the accuracy with which number-two flew his ILS approach. Lead was too far right to land safely and executed a go-around.

Investigators traced the source of the confusion to the distance verification query. The controller asked the pilot to confirm he was at 6½ miles, without specifying *from touchdown*, the pilot responded that he showed 7½, without specifying *DME*. The TACAN was located one mile from touchdown, so both were correctly describing the same point on final approach. The controller, however, interpreted the AC's position as one mile farther out than he really was and that's where number-two was. In this case, close enough definitely wasn't.

Cable Fable

Once upon a time there was a young Herky bird which was being prepared for flight. When the friendly fixers looked under the sleeping bird, they were shocked to discover several communications antennas broken or missing. They quickly reported the injury to their superiors, and soon many people were trying to solve the mystery of the damage to the Herky bird's tummy feathers. The mystery was solved when an investigator discovered the cause of the damage was a nasty cable stretched across the young aircraft's favorite landing runway. Designed to stop small, high-speed birds, this cable had accidentally been loosened by a large bird striking it. Once loosened, it was able to bounce up and bruise the belly of the next large bird rolling over it. Luckily, the fixers were able to patch the Herky's cuts and bruises and the busy turboprop was soon flying happily ever after.

Quick Stoppers



Integrated Circuit Training

Cruising unsuspectingly along at FL 350, this Galaxy's engineer suddenly detected a decrease in cabin pressure, to the tune of a 2,000 feet-per-minute decrease. He notified the pilot as he began troubleshooting the problem. He found the outflow valve rapidly self-opening so he selected manual and began working to close the valve.

In the meantime, the pilot called oceanic control and requested an emergency descent to 10,000 feet. Despite no immediate response, he began the descent for which he was eventually cleared. Even this quick, accurate response wasn't enough to arrest the physiologic consequences of exposure to altitude.

The scanner was seated in the courier compartment at the onset of the problem, and immediately ran forward to the flight station to don a smoke mask with a walk-around bottle, but she exceeded her time of useful consciousness in the effort. Alertly, the copilot donned his mask, then positioned the scanner's mask correctly to revive her. A loadmaster was in the aft bunk room and experienced symptoms of hypoxia but he managed to get his mask on and properly adjusted, at which time his symptoms disappeared. Two passengers in the cargo compartment attempted to place masks on infants before donning their own and lost consciousness. Both recovered after receiving oxygen.

Passing 18,000 feet, the pressurization system began to show signs of life, and after an hour at 10,000 feet the engineer was successful at maintaining stable cabin pressurization in the manual mode. For fuel conversation enroute to the emergency alternate airfield, the aircraft commander requested and was granted a climb back to 18,000 feet.

Safely back on the ground, the crewmembers and passengers underwent a medical examination which disclosed no lasting ill effects.

The cause of all this excitement? A single integrated circuit in the cabin air pressure control box burned out with no more ceremony than failure of an ordinary household lightbulb.

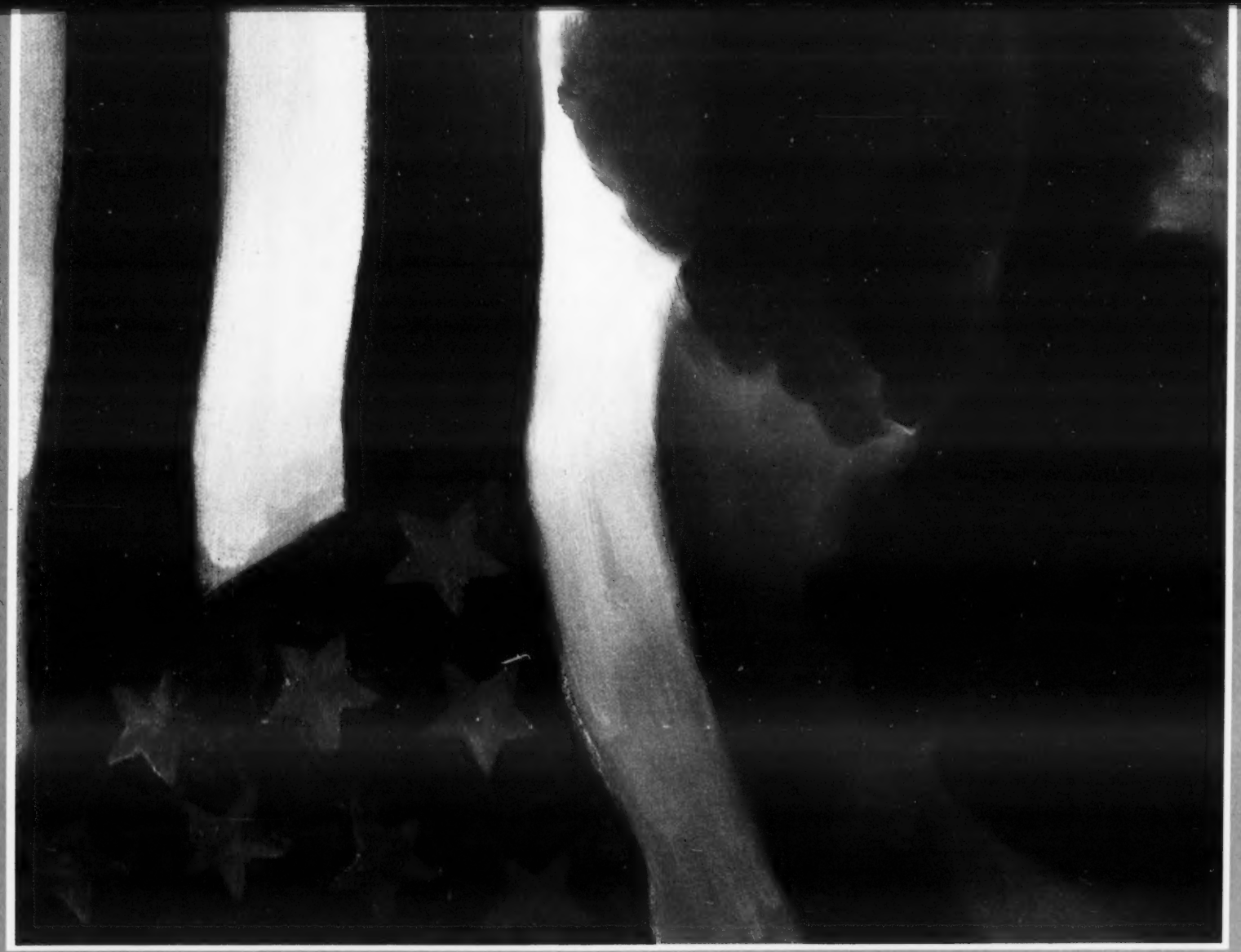
After Deadlines

CHARLESTON UNIT TOP STRATEGIC AIRLIFT SQUADRON—The 20th Military Airlift Squadron from the 437th Military Airlift Wing is MAC's Outstanding Strategic Airlift Squadron for 1984. The men and women of the 20 MAS logged over 16,000 accident-free flying hours during the competition period, while maintaining a 96.4 percent on-time departure rate. Congratulations from *TMF*!

SHOT IN THE FOOT AGAIN—In the May issue of *TMF*, in the article entitled "In the Zone," somehow, someway, we left out a line of type. How that line was omitted, especially after being reviewed by our eagle-eyed editorial staff, is beyond us. All of our coordination copies show the correct figure. But shock-of-shocks, the final printed edition for all the world to see was in error. For the record, the C-130E/Hs have to be at 115,000 pounds or heavier for a heavyweight landing, not 110,000 as was incorrectly printed. The 110,000 pounds refers, of course, to C-130Bs.

WORLD RECORD FOR THE C-130—A specially modified L-100-20 (that's the civilian designation for a "stretched" C-130) set three short-takeoff-and-landing "time-to-climb" records. The modified Herk, prepared by Lockheed-Georgia and called the High Technology Test Bed (HTTB), took off in about 427 meters, climbed to 3,000 meters in three minutes, 57.4 seconds; climbed to 6,000 meters in 9minutes, 0.35 seconds; and to 9,000 meters in 17 minutes, 41.71 seconds. Gross weight for takeoff was 98,600 pounds, for landing it was 95,000 pounds, and the HTTB's landing roll ended after 335 meters. The records were certified by the National Aeronautical Association, and verified by the Federation Aeronautique Internationale.

RESERVE UNITS ASSIST VICTIMS—A crew from the 919th Special Operations Group, Duke Field, Florida, successfully located four archaeologists lost in the jungles of Honduras. The crew was participating in Universal Trek '85, a joint U.S.-Honduran forces military training exercise. In another incident, a team from the 32nd Aeromedical Evacuation Group, Kelly AFB, Texas, joined forces with an active duty C-130 from Little Rock AFB, Arkansas, and the Army to evacuate a critically-burned man to Brooke Army Medical Center in San Antonio. The 32 AES crew then responded to a request to airlift a 4-year-old boy suffering from cerebral palsy and respiratory problems from Laughlin AFB to Lackland AFB, Texas.

ARMY TO DEVELOP LOW-ALTITUDE AIRDROP SYSTEM—The Army plans to develop an operational low-altitude airdrop system that will reduce the vulnerability of aircraft flying airdrop missions to hostile ground fire. The system could allow aircraft to airdrop from as low as 300 feet AGL while flying as fast as 130-150 knots indicated airspeed. The low altitude system is expected to employ a combination of parachutes and retrorockets to achieve low touchdown velocities.

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